

**REMARKS**

In the non-final Office Action, dated November 6, 2006, the Examiner made the restriction requirement final, withdrawing non-elected claims 20-43. The Examiner further rejected claims 1-19 and 44-53 under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 7,117,217 (hereinafter "OOI").

By way of the present amendment, claims 1, 9, 11, 12, 14, 17, 19, 44, 47, 50 and 53 have been amended to improve form. No new matter has been added by the present amendment. Reconsideration of the outstanding rejection of pending claims 1-19 and 44-53 is respectfully requested in view of the amendments above and the following remarks.

At the outset, Applicant requests that, after the Examiner has considered this amendment, that the Examiner contact Applicant's representative at 386-575-2713 so that an interview can be scheduled. Applicant requests an interview to resolve any outstanding issues and to expedite the prosecution and allowance of the present application.

**REJECTION UNDER 35 U.S.C. §102**

In paragraph 5, the Office Action rejects pending claims 1-19 and 44-53 under 35 U.S.C. §102(e) as allegedly being anticipated by OOI. Applicant respectfully traverses.

Amended independent claim 1, for example, recites a method that includes receiving one or more search queries, searching stored data based on the one or more search queries to generate results, wherein the results are orderable by one or more search characteristics and providing a document that includes a multi-dimensional graph of the results of the search, at least one of the

one or more search characteristics being represented as a dimension on the multi-dimensional graph.

A proper rejection under 35 U.S.C. §102 requires that a reference teach every aspect of the claimed invention. See M.P.E.P. §2131. OOI does not disclose or suggest the combination of features recited in Applicant's amended claim 1. For example, OOI does not disclose or suggest, among other features, results that are orderable by one or more search characteristics or providing a document that includes a multi-dimensional graph of the results of the search with at least one of the one or more search characteristics being represented as a dimension on the multi-dimensional graph, as recited in amended claim 1. The Office Action (pg. 4) relies on column 4, lines 23-43; column 2, line 9 to column 3, line 16; column 9, lines 25-53 and FIGs. 1 and 6A-10 and of OOI for allegedly disclosing the features of claim 1. Applicant respectfully traverses and submits that these sections of OOI, or any other section of OOI for that matter, do not disclose or suggest the combination of features recited in amended claim 1.

At column 4, lines 23-43, OOI discloses:

As shown in FIG. 1, there are two functional parts of the database management system 100: storage of data and retrieval of data. When high-dimensional points received from data input unit 10 have to be stored, the transform processor 30 first transforms by a mapping function, referred to herein as iMinMax( $\theta$ ), into single dimensional values in buffer 40. These single-dimensional values are then inserted into a secondary storage 50, such as in the form of a disk-based B<sup>+</sup>-tree. Since a single-dimensional indexing structure, like a B<sup>+</sup>-tree, clusters data that has similar values together, this effectively clusters high-dimensional points that are related. On the other hand, when retrieving data, a query (also in high-dimensional space) from the data retrieval input/output unit 20 will also be transformed using iMinMax( $\theta$ ) into a set of subqueries in single-dimension space in-buffer 40. These subqueries are then used to access the data from the secondary storage 50. Only a fraction of the secondary storage 50 will be searched, and only the relevant portions of the pages stored in secondary storage 50 will be

transferred into buffer 40. The relevant data is refined and returned to the data retrieval input/output as answers to the data retrieval input/output unit 20.

This section of OOI discloses the use of a mapping function,  $iMinMax(\theta)$ , that transforms high dimensional data into single dimensional values. The single dimensional values are then stored in a  $B^+$  tree data structure which effectively clusters related data points. A query, in high dimensional space, may then be transformed, using mapping function  $iMinMax(\theta)$ , into a set of subqueries in single-dimensional space that are then used to access data stored in the  $B^+$  tree. This section of OOI, however, does not disclose, or even suggest, results that are orderable by one or more search characteristics or providing a document that includes a multi-dimensional graph of the results of the search, at least one of the one or more search characteristics being represented as a dimension on the multi-dimensional graph," as recited in amended claim 1.

At column 2, line 9 to column 3, line 16, OOI generally discloses a database management process. This database management process transforms a high-dimensional data item to map the data item to single-dimensional space and obtains single-dimensional values that represent the high-dimensional data item (see column 2, lines 11-15). The transformed values for all data points may be ordered (see column 3, lines 1-4) and then indexed in a  $B^+$  tree structure for subsequent retrieval (see column 8-13). This section of OOI, thus, merely discloses the transformation of a high-dimensional data item into a single-dimensional value, ordering of the transformed values, and then indexing of the transformed values in a  $B^+$  tree structure for subsequent retrieval. This section of OOI does not disclose, or even suggest, results that are orderable by one or more search characteristics or providing a document that includes a multi-dimensional graph of the results of the search with at least one of the one or more search

characteristics being represented as a dimension on the multi-dimensional graph, as recited in amended claim 1.

At column 9, lines 25-53, OOI discloses:

In the first set of experiments, the number of dimensions is varied from 8 to 50. The data set is uniformly distributed over the domain space. There are a total of 100K points. In the first experiment, besides the Pyramid scheme, we also compare against the MAX scheme and the sequential scan (seq-scan) technique. The MAX scheme is the simple scheme that maps each point to its maximum value. However, the transformed space is not partitioned. Moreover, two variations of  $iMinMax(\theta)$  are used, namely  $iMax$  (i.e.,  $\theta=1$ ) and  $iMinMax(\theta=0.0)$  (denoted as  $iMinMax$ ). FIG. 6A shows the results. First, we note that both the MAX and seq-scan techniques perform poorly, and their I/O cost increases with the higher number of dimensions. MAX performs slightly worse because of the additional internal nodes to be accessed and the high number of false drops.

This section of OOI describes FIG. 6A, which graphically depicts the results of a set of experiments in which data points are transformed and then indexed in a data structure (e.g., a B+ tree structure), and the data is subsequently retrieved using the indexed data structure. FIG. 6A depicts a plot that shows the average page access cost (the y axis), when retrieving the data from the data structure, as a function of the number of dimensions that the transformed data points had prior to the transformation (the x axis). FIG. 6A, thus, shows how effective use of the transformation algorithm of OOI is when accessing transformed data points that originally had multiple dimensions (e.g., dimension values of 5-55 are depicted along the x axis in FIG. 6A). This section of OOI, however, does not disclose or suggest results that are orderable by one or more search characteristics or providing a document that includes a multi-dimensional graph of the results of the search with at least one of the one or more search characteristics being

represented as a dimension on the multi-dimensional graph, as recited in amended claim 1.

FIG. 1 of OOI discloses the overall system employed in OOI. The system includes a data input unit 10, a data retrieval input/output unit 20, a transform processor 30, a buffer 40 and a secondary storage 50. As disclosed in column 4, lines 1-21 of OOI, the data input unit 10 inputs data to be indexed and stored by the database management system. The data retrieval input/output unit 20 inputs search queries for data retrieval and outputting query results (column 4, lines 1-21). The transform processor 30 transforms high dimensional data points received from data input unit 10 and high-dimensional queries received from unit 20 (column 4, lines 1-21). Buffer 40 temporarily stores data points transformed by processor 30 prior to their indexing and storage in secondary storage 50 (column 4, lines 1-21). FIG. 1 of OOI, therefore, merely discloses the various system components used in transforming high-dimensional data items and the indexing and storing of those transformed data items in a data structure. FIG. 1 of OOI does not disclose or suggest “wherein the results are orderable by one or more search characteristics” and “providing a document that includes a multi-dimensional graph of the results of the search, at least one of the one or more search characteristics being represented as a dimension on the multi-dimensional graph,” as recited in amended claim 1.

FIGS. 6B-10 of OOI merely disclose various different graphical depictions of the results of a set of experiments in which data points are transformed (using the transform processor of OOI) and indexed in a data structure, and the indexed data is then retrieved. The various graphical depictions of FIGS. 6B-10, however, do not disclose, or even suggest, results that are orderable by one or more search characteristics or providing a document that includes a multi-

dimensional graph of the results of the search with at least one of the one or more search characteristics being represented as a dimension on the multi-dimensional graph, as recited in amended claim 1.

Since OOI does not disclose each and every feature of amended claim 1, OOI cannot anticipate claim 1. Withdrawal of the rejection of claim 1 under 35 U.S.C. §102 is, therefore, respectfully requested.

Claims 2-18 depend from claim 1. These claims are, therefore, not anticipated by OOI for at least the reasons set forth above with respect to claim 1. Furthermore, these claims include additional features not disclosed or suggested by OOI.

For example, claim 8 recites that a second dimension of the multi-dimensional graph comprises relevance. This feature is not disclosed or suggested by OOI. The Office Action (pg. 5) relies on FIGS. 7A-7B; column 9, lines 25-67 and column 10, lines 1-58 of OOI for allegedly disclosing the features of claim 8. As discussed above with respect to claim 1, FIGS. 7A and 7B merely disclose graphical depictions of the results of a set of experiments in which data points are transformed (using the transform processor of OOI) and indexed in a data structure, and the indexed data is then retrieved. FIGS. 7A and 7B do not disclose or suggest that a second dimension of the multi-dimensional graph comprises relevance, as recited in claim 8.

As also discussed above with respect to claim 1, column 9, lines 25-53, which describes FIG. 6A, merely demonstrates how effective use of the transformation algorithm of OOI is when accessing transformed data points that originally had multiple dimensions. Column 9, lines 53-67 of OOI further disclose experiment results when different factors are studied (e.g., the data set

sizes vary from 100K to 500K points, query selectivities vary from 0.01% to 10%, etc.). Column 9, lines 25-67 of OOI, thus, does not disclose or even suggest a second dimension of the multi-dimensional graph that comprises relevance, as recited in claim 8.

Column 10, lines 1-58 of OOI describe FIGS. 8A-10. As discussed above with respect to claim 1, these figures merely disclose various different graphical depictions of the results of a set of experiments in which data points are transformed (using the transform processor of OOI) and indexed in a data structure, and the indexed data is then retrieved. Column 10, lines 1-58, and FIGS. 8A-10 of OOI do not disclose, or even suggest a second dimension of the multi-dimensional graph that comprises relevance, as recited in claim 8.

Dependent claim 9 recites that the one or more search characteristics comprise one of recency, price, dates, image quality, image size or geographic distance. These features are not disclosed or suggested by OOI. The Office Action (pg. 6) relies on the same sections of OOI that the Office Action relied on for allegedly disclosing the features of claim 8 above, the features of which are entirely different than the features recited in claim 9. Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the features recited in claim 9. If the Office Action persists in maintaining this rejection, Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the features recited in the claim. Otherwise, Applicant requests that the rejection of claim 9 be withdrawn.

Dependent claim 11 recites that a scaling of an axis corresponding to the dimension is non-linear. This feature is not disclosed or suggested by OOI. The Office Action (pg. 6) relies

on the same sections of OOI that the Office Action relied on for allegedly disclosing the features of claim 8 above, the features of which are entirely different than the feature recited in claim 11.

Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the features recited in claim 11. If the Office Action persists in maintaining this rejection, Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the feature recited in the claim. Otherwise, Applicant requests that the rejection of claim 11 be withdrawn.

Dependent claim 12 recites that at least a portion of the axis corresponding to the dimensions comprises a logarithmic scale. This feature is not disclosed or suggested by OOI. The Office Action (pg. 6) relies on the same sections of OOI that the Office Action relied on for allegedly disclosing the feature of claim 8 above, the features of which are entirely different than the features recited in claim 12. Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the feature recited in claim 12. If the Office Action persists in maintaining this rejection, Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the feature recited in the claim. Otherwise, Applicant requests that the rejection of claim 12 be withdrawn.

Dependent claim 14 recites receiving user input to selectively alter a resolution of the dimension of the multi-dimensional graph. This feature is not disclosed or suggest by OOI. The Office Action (pg. 6) relies on FIG. 6A and column 9, lines 25-53 of OOI for allegedly disclosing this feature. As discussed above with respect to claim 1, FIG. 6A and column 9, lines 25-53 of OOI merely show how effective use of the transformation algorithm of OOI is when



accessing transformed data points that originally had multiple dimensions. These sections of OOI do not disclose, suggest, or have anything to do with receiving user input to selectively alter a resolution of the dimension of the multi-dimensional graph, as recited in claim 14. Withdrawal of the rejection of claim 14 is requested for at least this additional reason.

Claim 15 recites that each of the results has a visual representation on the multi-dimensional graph and wherein a size associated with each of the representations is varied based on a relevance associated with each of the results. These features are not disclosed or suggested by OOI. The Office Action (pgs. 6-7) relies on the same sections of OOI that the Office Action relied on for allegedly disclosing the features of claim 14 above, the features of which are entirely different than the features recited in claim 15. Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the features recited in claim 15. If the Office Action persists in maintaining this rejection, Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the features recited in the claim. Otherwise, Applicant requests that the rejection of claim 15 be withdrawn.

Claim 17 recites that each of the results has a visual representation on the multi-dimensional graph and that respective visual representations may visually overlap one another. These features are not disclosed or suggested by OOI. The Office Action (pg. 7) relies on the same sections of OOI that the Office Action relied on for allegedly disclosing the features of claim 14 above, the features of which are entirely different than the features recited in claim 17. Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the features recited in claim 17. If the Office Action persists in maintaining this rejection,

Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the features recited in the claim. Otherwise, Applicant requests that the rejection of claim 17 be withdrawn.

Claim 18 recites that the respective visual representation may visually overlap one another based on relevance. This feature is not disclosed or suggested by OOI. The Office Action (pg. 7) relies on the same sections of OOI that the Office Action relied on for allegedly disclosing the feature of claim 14 above, the features of which are entirely different than the feature recited in claim 18. Applicant submits that the cited sections of OOI do not disclose, suggest, or have anything to do with, the feature recited in claim 18. If the Office Action persists in maintaining this rejection, Applicant respectfully requests that the Office Action cite to appropriate sections of the cited reference that actually disclose the feature recited in the claim. Otherwise, Applicant requests that the rejection of claim 18 be withdrawn.

Amended independent claim 19 recites features that are similar to (though possibly having different scope than) the features of claim 1. Withdrawal of the rejection of claim 19 is requested for at least similar reasons to those set forth above with respect to claim 1.

Amended independent claim 44 recites a method that includes receiving one or more search queries, searching stored data based on the one or more search queries to generate results, where the results are orderable using multiple search characteristics and generating an output, corresponding to the results of the search, that includes multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple dimensions of the output. The Office Action (pg. 8) relies on the same sections of OOI for allegedly

disclosing the features of this claim as the Office Action relied on for rejecting claim 1. These sections include column 4, lines 23-43; column 2, line 9 through column 3, line 16; column 9, lines 25-53; FIG. 1; and FIGS. 6A-10 of OOI. These sections of OOI relied on by the Office Action do not disclose or suggest the combination of features recited in amended claim 44.

As discussed above with respect to claim 1, column 4, lines 23-43 of OOI discloses the use of a mapping function,  $iMinMax(\theta)$ , that transforms high dimensional data into single dimensional values. The single dimensional values are then stored in a  $B^+$  tree which effectively clusters related data points. A query, in high dimensional space, may then be transformed, using mapping function  $iMinMax(\theta)$ , into a set of subqueries in single-dimension space that are then used to access data stored in the  $B^+$  tree. This section of OOI does not disclose or suggest results that are orderable using multiple search characteristics or generating an output, corresponding to the results of the search, that includes multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple dimensions of the output, as recited in amended claim 44.

As further discussed above with respect to claim 1, column 2, line 9 to column 3, line 16 of OOI merely discloses the transformation of a high-dimensional data item into a single-dimensional value, ordering of the transformed values, and then indexing of the transformed values in a  $B^+$  tree structure for subsequent retrieval. This section of OOI does not disclose, or even suggest, results that are orderable using multiple search characteristics or generating an output, corresponding to the results of the search, that includes multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple

dimensions of the output, as recited in amended claim 44.

As also discussed above with respect to claim 1, column 9, lines 25-53 of OOI discloses how effective use of the transformation algorithm of OOI is when accessing transformed data points that originally had multiple dimensions. This section of OOI, however, does not disclose or suggest results that are orderable using multiple search characteristics or generating an output, corresponding to the results of the search, that includes multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple dimensions of the output, as recited in amended claim 44.

As further discussed above with respect to claim 1, FIG. 1 of OOI merely discloses the various system components used in transforming high-dimensional data items and the indexing and storing of those transformed data items in a data structure. FIG. 1 of OOI, however, does not disclose or suggest results that are orderable using multiple search characteristics or generating an output, corresponding to the results of the search, that includes multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple dimensions of the output, as recited in amended claim 44.

As additionally discussed above with respect to claim 1, FIGS. 6B-10 of OOI merely disclose various different graphical depictions of the results of a set of experiments in which data points are transformed (using the transform processor of OOI) and indexed in a data structure, and the indexed data is then retrieved. The various graphical depictions of FIGS. 6B-10, however, do not disclose, or even suggest, results that are orderable using multiple search characteristics or generating an output, corresponding to the results of the search, that includes

multiple dimensions with each of the multiple search characteristics corresponding to a different dimension of the multiple dimensions of the output, as recited in amended claim 44.

Since OOI does not disclose each and every feature recited in amended claim 44, OOI cannot anticipate claim 44. Withdrawal of the rejection of claim 44 under 35 U.S.C. §102 is, therefore, respectfully requested.

Claims 45-52 depend from claim 44. These claims, therefore, are not anticipated by OOI for at least the reasons set forth above with respect to claim 44. Furthermore, these claims recite additional features not disclosed or suggested by OOI. For example, claim 49 recites that one dimension of the multiple dimensions comprises relevance. This feature is not disclosed or suggested by OOI. Since claim 49 recites similar features to (though possibly having different scope than) those discussed above with respect to claim 8, this claim is not anticipated by OOI for similar reasons to those set forth above with respect to claim 8.

Additionally, claim 50 recites that at least one of the multiple search characteristics comprises one of recency, price, dates, image quality, image size or geographic distance. These features are not disclosed or suggested by OOI. Since claim 50 recites similar features to (though possibly having different scope than) those discussed above with respect to claim 9, this claim is not anticipated by OOI for similar reasons to those set forth above with respect to claim 9.

In view of the foregoing amendments and remarks, Applicant respectfully requests the Examiner's reconsideration of this application, and the timely allowance of the pending claims. As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these

rejections, Applicant's silence as to assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, assertions as to dependent claims, etc.) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such assertions/requirements in the future.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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